

MAPS+IT+TPC performance update

Veronica & Carlos
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A word on efficiency

$$(2016/09) \text{ Efficiency} = \frac{(\text{emb}) \text{ g4primary matched to best track}}{\text{All (embedded) g4primaries}}$$

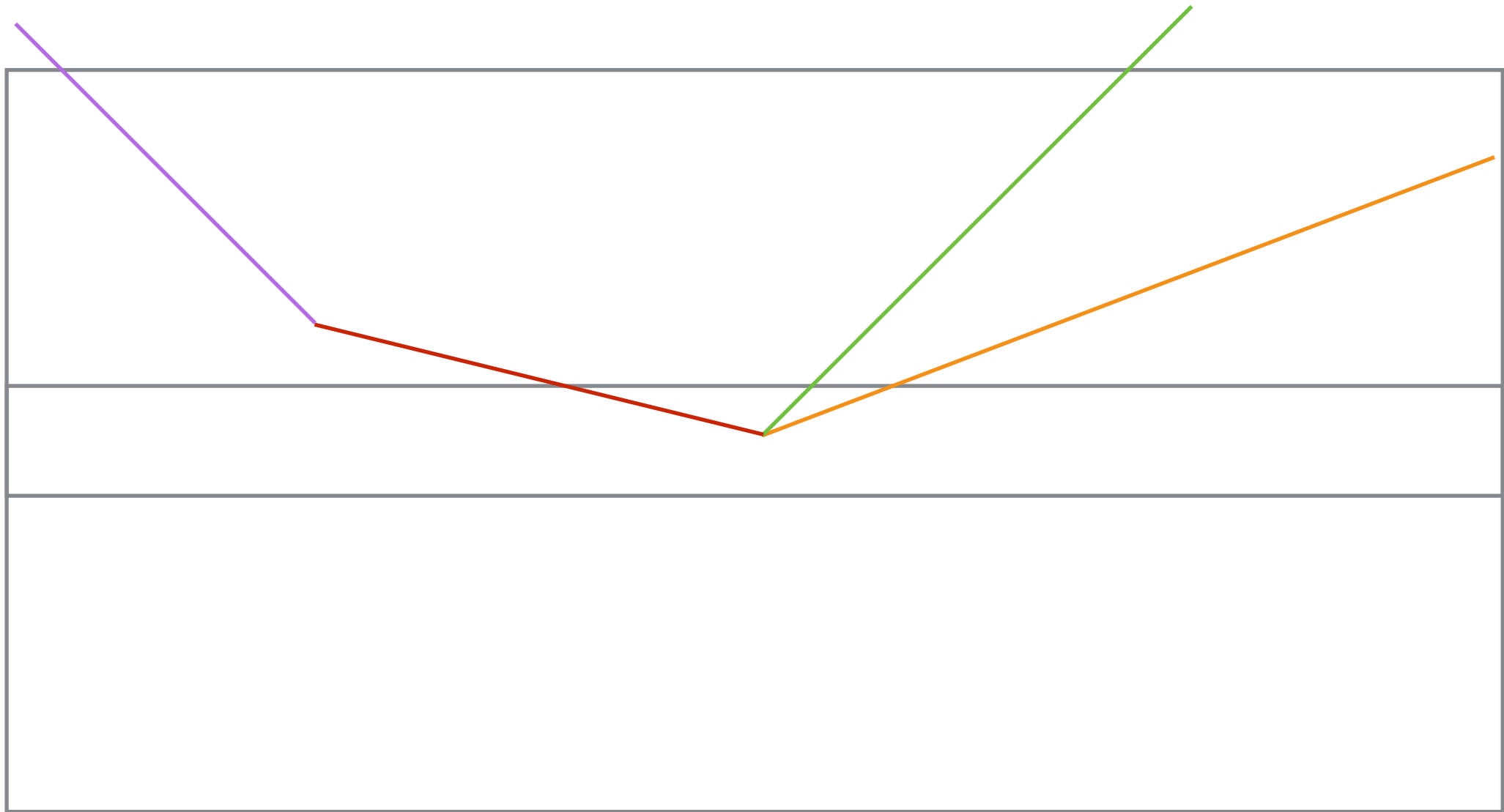
Troublesome definition:

1. overestimate the amount of particles that can be physically reconstructed (e.g. eta acceptance). Low efficiency bias.
2. has little sensitivity to reconstructed track quality (e.g. “matched” can be done to track fraction or bad fit). High efficiency bias.

In the following slides we will provide a alternative definition

Some new definitions

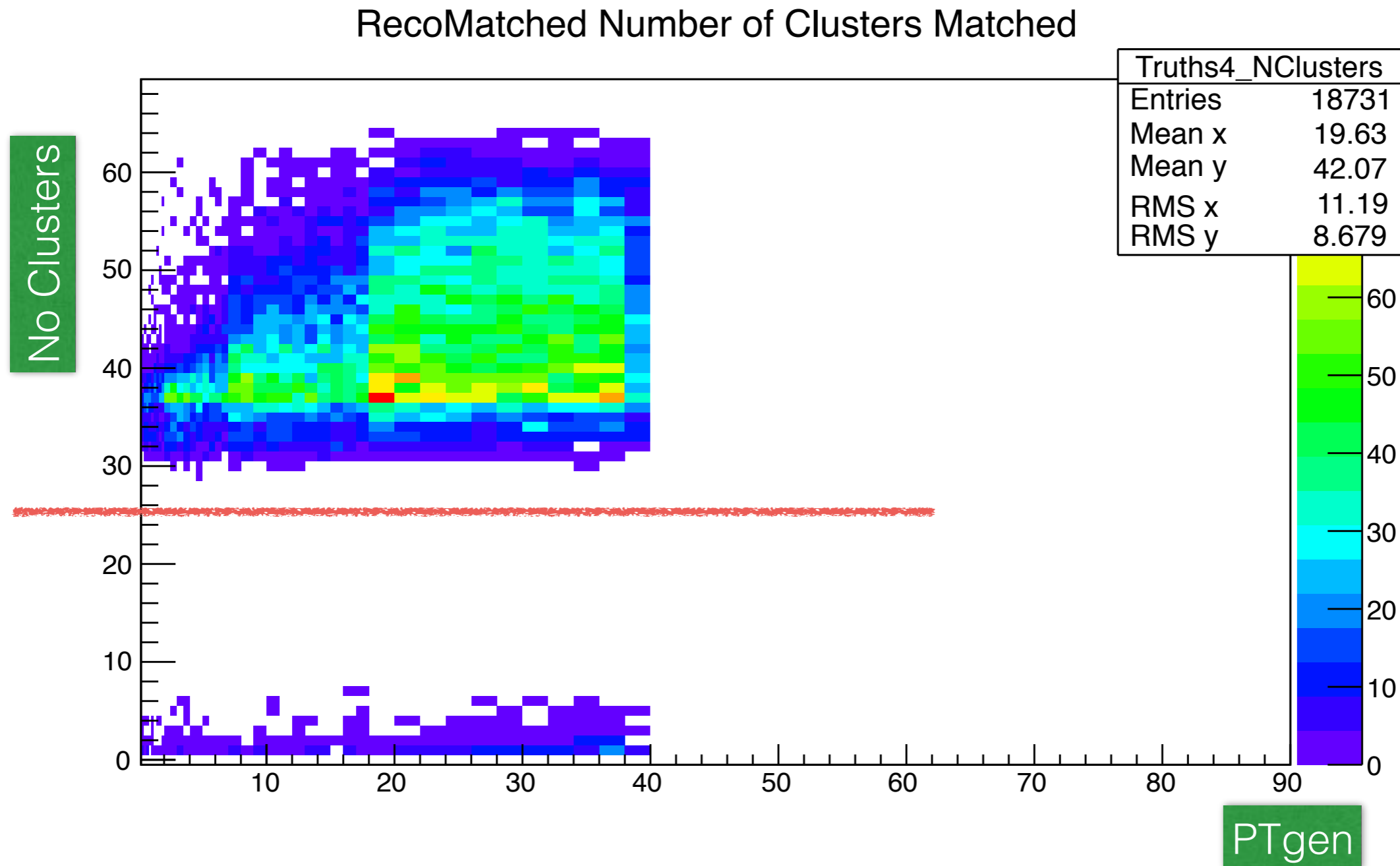
- **Reconstructable** particle: primary that crosses at least 40/60 layers in the TPC.



Some new definitions

- **Reconstructable** particle: primary that crosses at least 40/60 layers in the TPC.
- **Fairly** well matched **track**: track that matches to a MCtruth with a number of cluster contribution higher of at least 25. cut depends on MC
- **Good track**: track that passes $\text{Chi2NDF} \leq 2$; $\text{NClus} \geq 25$ standalone cut

Number of Clusters

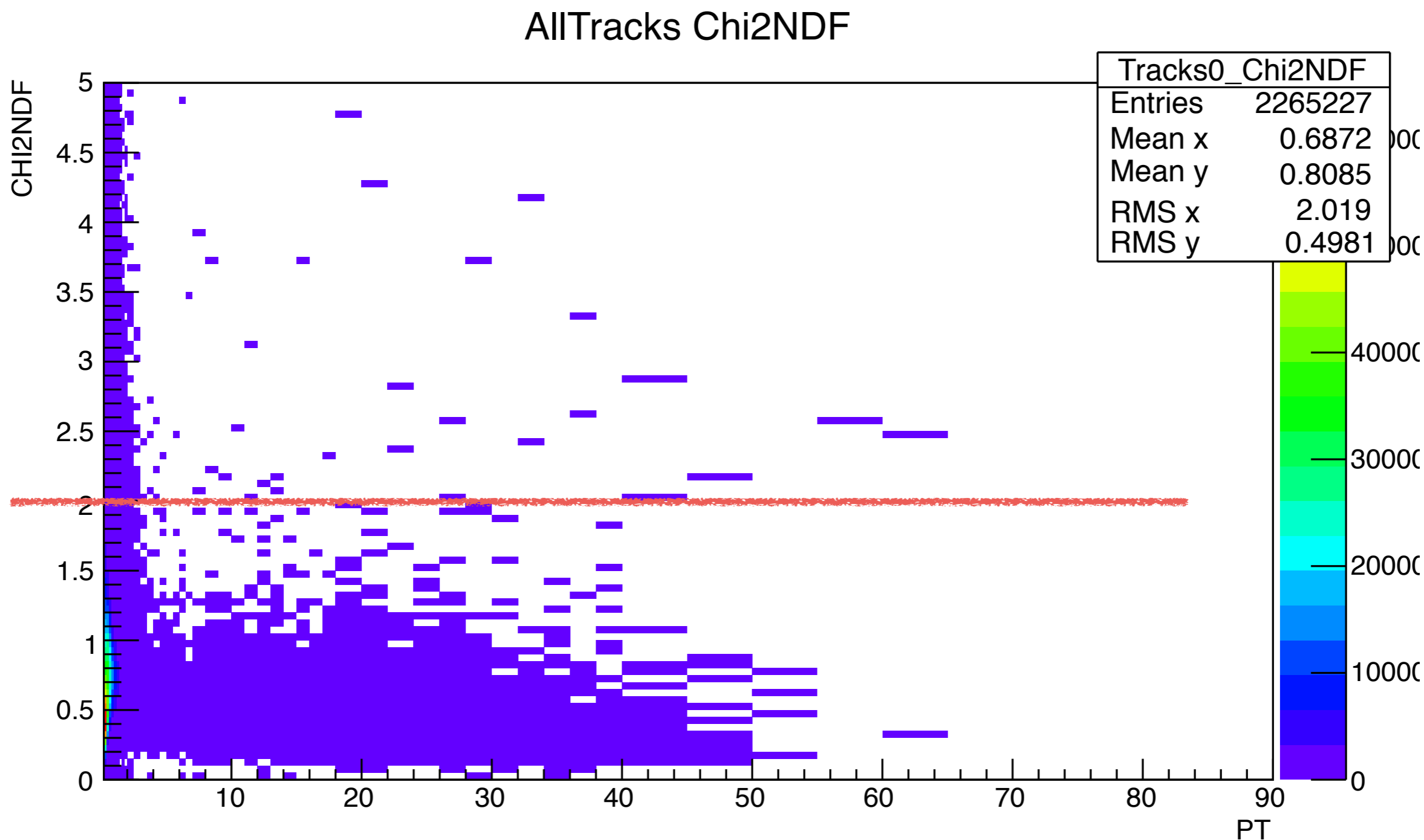


“Tracks matched to a MC-truth”.

Tracks with low number of clusters are not good.

New selection cut: $nclusters > 25$

Chi2NDF



Many tracks with high chi2ndf specially at low pt.
New selection cut: $\text{Chi2}/\text{ndf} < 2$

Some new definitions

- **Reconstructable** particle: primary that crosses at least 40/60 layers in the TPC.
- **Fairly** well matched **track**: track that matches to a MCtruth with a number of cluster contribution higher of at least 25.
- **Good track**: track that passes $\text{Chi2NDF} \leq 2$; $\text{NClus} \geq 25$
- **Efficiency**

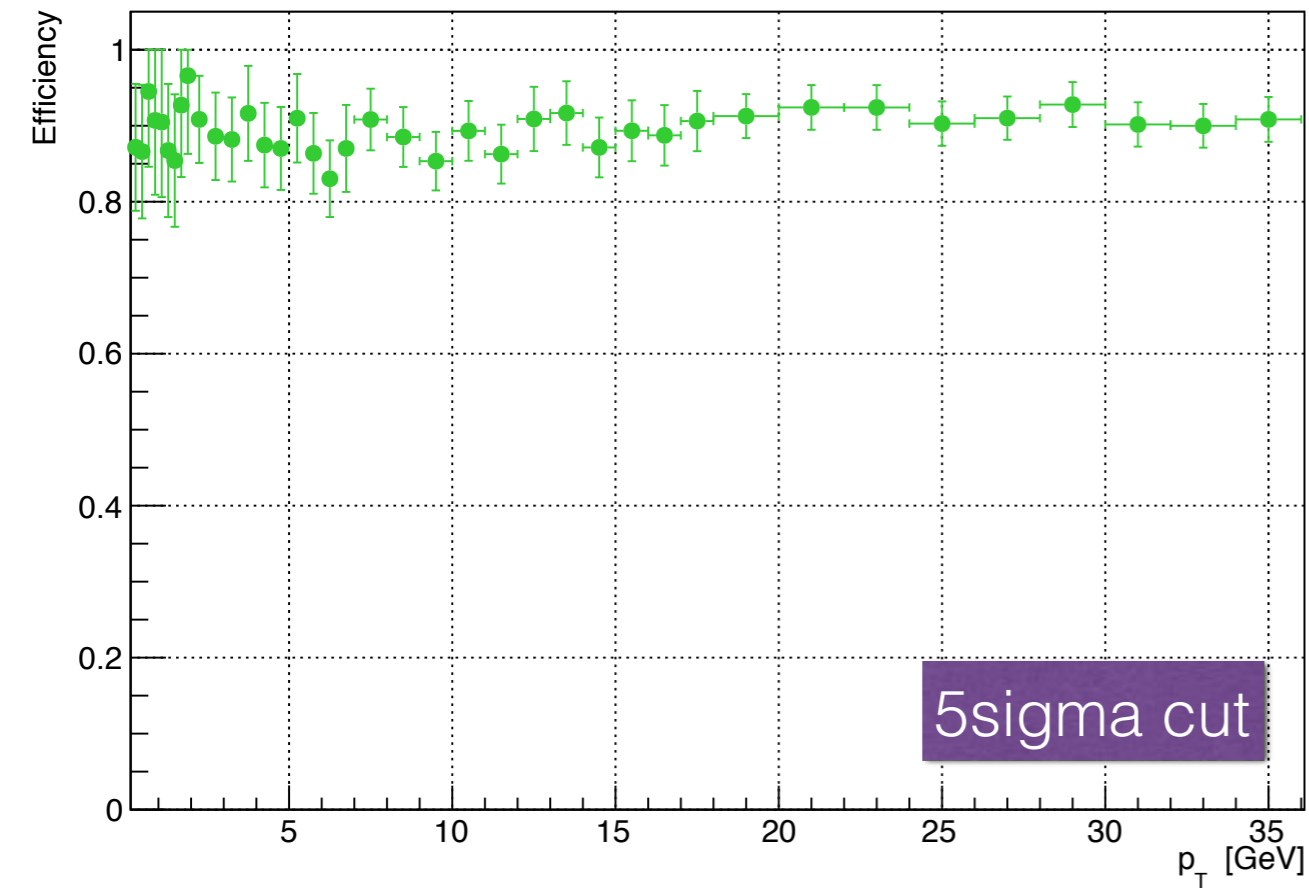
$$\text{MaxAcEff} = \frac{\text{rg4primary matched to "fair track"}}{\text{All rg4primaries}}$$

Max achievable efficiency

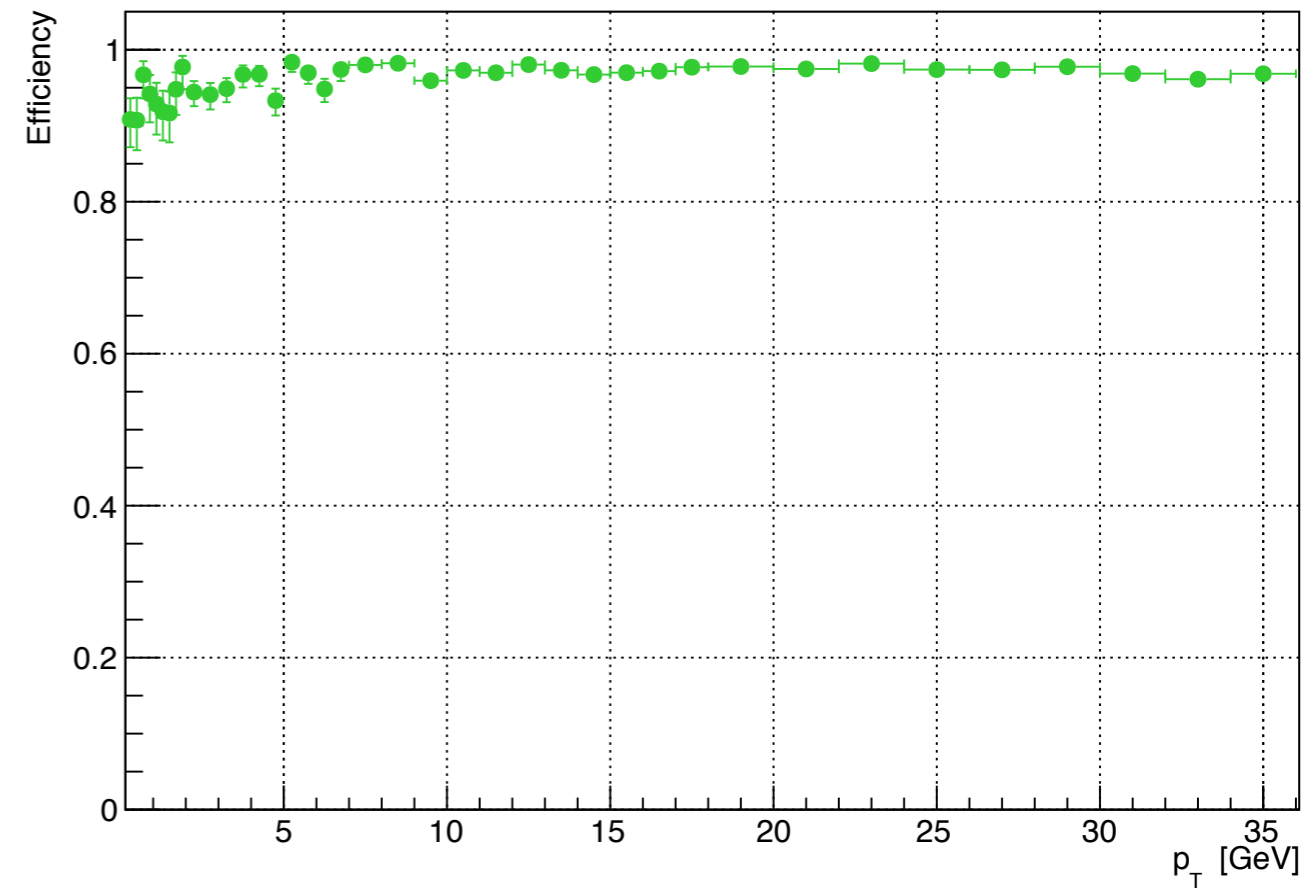
$$\text{Eff} = \frac{\text{"Good track" matched to rg4primary}}{\text{All rg4primaries}}$$

Efficiency of current software

Efficiency



Efficiency of current software



Max achievable efficiency

Pt Resolution

